

What is claimed is:

1. An isolated nucleic acid fragment comprising a corn oleosin promoter wherein said promoter can be full length or partial and further wherein said promoter comprises a nucleotide sequence corresponding substantially to the nucleotide sequence in any of SEQ ID NOS:19 or 38-49 or said promoter comprises a fragment or subfragment that is substantially similar and functionally equivalent to any of the nucleotide sequences set forth in SEQ ID NOS:19 or 38-49.

2. The fragment or subfragment of Claim 1 wherein said fragment or subfragment hybridizes to the nucleotide sequence set forth in SEQ ID NOS:19 or 38-49 under moderately stringent conditions.

3. An isolated nucleic acid fragment encoding a corn delta-9 stearoyl-ACP desaturase corresponding substantially to a nucleotide sequence set forth in any of SEQ ID NOS:8 and 10 or any functionally equivalent subfragment thereof.

4. An isolated nucleic acid fragment encoding a corn delta-12 desaturase corresponding substantially to the nucleotide sequence set forth in SEQ ID NO:2 or any functionally equivalent subfragment thereof.

5. A chimeric gene comprising the nucleic acid fragment of Claim 3 or the reverse complement of the nucleic acid fragment of Claim 3 operably linked to suitable regulatory sequences wherein expression of the chimeric gene results in an altered corn stearic acid phenotype.

6. A chimeric gene comprising the nucleic acid fragment of Claim 4 or the reverse complement of the nucleic acid fragment of Claim 4 operably linked to suitable regulatory sequences wherein expression of the chimeric gene results in an altered corn oleic acid phenotype.

7. The chimeric gene of Claim 5 further comprising the nucleic acid fragment of Claim 1 or 2.

8. The chimeric gene of Claim 6 further comprising the nucleic acid fragment of Claim 1 or 2.

9. The chimeric gene of Claim 5 further comprising a shrunken 1 intron/exon.

10. The chimeric gene of Claim 6 further comprising a shrunken 1 intron/exon.

11. The chimeric gene of Claim 7 further comprising a shrunken 1 intron/exon.

12. The chimeric gene of Claim 8 further comprising a shrunken 1 intron/exon.

13. A chimeric gene comprising the nucleic acid fragment of Claim 3 or the reverse complement thereof and a nucleic acid fragment encoding a corn delta-12 desaturase, any

functionally equivalent subfragment thereof or the reverse complement of said fragment or subfragment wherein said fragments are operably linked and further wherein expression of the chimeric gene results in an altered corn oil phenotype.

4. The chimeric gene of Claim 13 wherein the nucleic acid fragment encoding a corn delta-12 desaturase corresponds substantially to the nucleotide sequence set forth in SEQ ID NO:2 or any functionally equivalent subfragment thereof.

5 15. A chimeric gene comprising the nucleic acid fragment of Claim 1 or 2, the nucleic acid fragment of Claim 3 or the reverse complement thereof and a nucleic acid sequence encoding a corn delta-12 desaturase, any functionally equivalent subfragment thereof or the reverse complement of said fragment or subfragment wherein said fragments are operably linked and further wherein expression of the chimeric gene results in an altered corn oil phenotype.

10 16. The chimeric gene of Claim 15 wherein the nucleic acid fragment encoding a corn delta-12 desaturase enzyme corresponds substantially to the nucleotide sequence set forth in SEQ ID NO:2 or any functionally equivalent subfragment thereof.

15 17. A chimeric gene comprising the nucleic acid fragment of Claim 3, a nucleic acid sequence encoding a corn delta-12 desaturase, any functionally equivalent subfragment thereof or the reverse complement of said fragment or subfragment and a shrunken 1 intron/exon wherein said fragments are operably linked and further wherein expression of the chimeric gene results in an altered corn oil phenotype.

20 18. The chimeric gene of Claim 17 wherein the nucleic acid fragment encoding the delta-12 desaturase corresponds substantially to the nucleotide sequence set forth in SEQ ID NO:2 or any functionally equivalent subfragment thereof.

25 19. A chimeric gene comprising the nucleic acid fragment of Claim 1 or 2, the nucleic acid fragment of Claim 3 or the reverse complement thereof, a nucleic acid sequence encoding a corn delta-12 desaturase, any functionally equivalent subfragment thereof, or the reverse complement of said fragment or subfragment and a shrunken 1 intron/exon wherein said fragments are operably linked and further wherein expression of the chimeric gene results in an altered corn oil phenotype.

30 20. The chimeric gene of Claim 19 wherein the nucleic acid fragment encoding the delta-12 desaturase corresponds substantially to the nucleotide sequence set forth in SEQ ID NO:2 or any functionally equivalent subfragment thereof.

35 21. A chimeric gene comprising the nucleic acid fragment of Claim 1 or 2, the nucleic acid fragment of Claim 3 or the reverse complement thereof, the nucleic acid fragment of Claim 4 or the complement thereof and a shrunken 1 intron/exon wherein said fragments are operably linked and further wherein the expression of the chimeric gene results in an altered corn oil phenotype.

22. A chimeric gene comprising an isolated nucleic acid fragment encoding a corn delta-12 desaturase corresponding substantially to the nucleotide sequence set forth in SEQ ID NO:1, a functionally equivalent subfragment thereof or the reverse complement of said fragment or subfragment, or an isolated nucleic acid fragment corresponding substantially to

the nucleotide sequence set forth in SEQ ID NO:58 or 59 or a functionally equivalent subfragment thereof or the reverse complement of such fragment or subfragment, the nucleic acid fragment of Claim 1 or 2 and shrunken 1 intron/exon wherein said fragments are operably linked and further wherein expression of the chimeric gene results in an altered corn oleic acid phenotype.

23. A corn plant or plant parts thereof comprising the chimeric gene of Claim 5.

24. A corn grain obtained from the plant of Claim 23 wherein said grain has either a stearic acid content of not less than about 20% of the total oil content or a total saturate content of not less than about 35% of the total oil content.

25. A corn plant or plant parts thereof comprising the chimeric gene of Claim 6.

26. A corn grain obtained from the plant of Claim 25 wherein said grain has an oleic acid content of not less than about 60% of the total oil content.

27. A corn plant or plant parts thereof comprising the chimeric gene of Claim 7.

28. A corn grain obtained from the plant of Claim 27 wherein said grain has either a stearic acid content of not less than about 20% of the total oil content or a total saturate content of not less than about 35% of the total oil content.

29. A corn plant or plant parts thereof comprising the chimeric gene of Claim 8.

30. A corn grain obtained from the plant of Claim 29 wherein said grain has an oleic acid content of not less than about 60% of the total oil content.

31. A corn plant or plant parts thereof comprising the chimeric gene of Claim 9.

32. A corn grain obtained from the plant of Claim 31 wherein said grain has either a stearic acid content of not less than about 20% of the total oil content or a total saturate content of not less than about 35% of the total oil content.

33. A corn plant or plant parts thereof comprising the chimeric gene of Claim 10.

34. A corn grain obtained from the plant of Claim 33 wherein said grain has an oleic acid content of not less than about 60% of the total oil content.

35. A corn plant or plant parts thereof comprising the chimeric gene of Claim 11.

36. A corn grain obtained from the plant of Claim 35 wherein said grain has either a stearic acid content of not less than about 20% of the total oil content or a total saturate content of not less than about 35% of the total oil content.

37. A corn plant or plant parts thereof comprising the chimeric gene of Claim 12.

38. A corn grain obtained from the plant of Claim 37 wherein said grain has an oleic acid content of not less than about 60% of the total oil content.

39. A corn plant or plant parts thereof comprising the chimeric gene of Claim 13.

40. A corn grain obtained from the plant of Claim 39 wherein said grain has a total saturate content of not less than about 30% of the total oil content and an oleic acid content of not less than about 30% of the total oil content.

41. A corn plant or plant parts thereof comprising the chimeric gene of Claim 14.

42. A corn grain obtained from the plant of Claim 41 wherein said grain has a total saturate content of not less than about 30% of the total oil content and an oleic acid content of not less than about 30% of the total oil content.

43. A corn plant or plant parts thereof comprising the chimeric gene of Claim 15.

5 44. A corn grain obtained from the plant of Claim 43 wherein said grain has a total saturate content of not less than about 30% of the total oil content and an oleic acid content of not less than about 30% of the total oil content.

45. A corn plant or plant parts thereof comprising the chimeric gene of Claim 16.

10 46. A corn grain obtained from the plant of Claim 45 wherein said grain has a total saturate content of not less than about 30% of the total oil content and an oleic acid content of not less than about 30% of the total oil content.

47. A corn plant or plant parts thereof comprising the chimeric gene of Claim 17.

15 48. A corn grain obtained from the plant of Claim 47 wherein said grain has a total saturate content of not less than about 30% of the total oil content and an oleic acid content of not less than about 30% of the total oil content.

49. A corn plant or plant parts thereof comprising the chimeric gene of Claim 18.

50. A corn grain obtained from the plant of Claim 49 wherein said grain has a total saturate content of not less than about 30% of the total oil content and an oleic acid content of not less than about 30% of the total oil content.

20 51. A corn plant or plant parts thereof comprising the chimeric gene of Claim 19.

52. A corn grain obtained from the plant of Claim 51 wherein said grain has a total saturate content of not less than about 30% of the total oil content and an oleic acid content of not less than about 30% of the total oil content.

53. A corn plant or plant parts thereof comprising the chimeric gene of Claim 20.

25 54. A corn grain obtained from the plant of Claim 53 wherein said grain has a total saturate content of not less than about 30% of the total oil content and an oleic acid content of not less than about 30% of the total oil content.

55. A corn plant or plant parts thereof comprising the chimeric gene of Claim 21.

30 56. A corn grain obtained from the plant of Claim 55 wherein said grain has a total saturate content of not less than about 30% of the total oil content and an oleic acid content of not less than about 30% of the total oil content.

57. A corn plant or plant parts thereof comprising one chimeric gene selected from the chimeric genes of Claims 5, 7, 9, and 11 and one chimeric gene selected from the chimeric genes of Claims 6, 8, 10, and 12.

35 58. A corn grain obtained from the plant of Claim 57 wherein said grain has a total saturate content of not less than about 30% of the total oil content and an oleic acid content of not less than about 30% of the total oil content.

59. A corn plant or plant parts thereof comprising the chimeric gene of Claim 22.

60. A corn grain obtained from the plant of Claim 59 wherein said grain has an oleic acid content of not less than about 60% of the total oil content.

61. Seeds of the corn plant of Claim 23 or 25.

62. Seeds of the corn plant of Claim 27.

63. Seeds of the corn plant of Claim 29.

64. Seeds of the corn plant of Claim 31.

65. Seeds of the corn plant of Claim 33.

66. Seeds of the corn plant of Claim 35.

67. Seeds of the corn plant of Claim 37.

68. Seeds of the corn plant of Claim 39.

69. Seeds of the corn plant of Claim 41.

70. Seeds of the corn plant of Claim 43.

71. Seeds of the corn plant of Claim 45.

72. Seeds of the corn plant of Claim 47.

73. Seeds of the corn plant of Claim 49.

74. Seeds of the corn plant of Claim 51.

75. Seeds of the corn plant of Claim 53.

76. Seeds of the corn plant of Claim 55.

77. Seeds of the corn plant of Claim 57.

78. Seeds of the corn plant of Claim 59.

79. Oil obtained from the grain of the corn plants of Claims 23 or 25.

80. Oil obtained from the grain of the corn plant of Claim 27.

81. Oil obtained from the grain of the corn plant of Claim 29.

82. Oil obtained from the grain of the corn plant of Claim 31.

83. Oil obtained from the grain of the corn plant of Claim 33.

84. Oil obtained from the grain of the corn plant of Claim 35.

85. Oil obtained from the grain of the corn plant of Claim 37.

86. Oil obtained from the grain of the corn plant of Claim 39.

87. Oil obtained from the grain of the corn plant of Claim 41.

88. Oil obtained from the grain of the corn plant of Claim 43.

89. Oil obtained from the grain of the corn plant of Claim 45.

90. Oil obtained from the grain of the corn plant of Claim 47.

91. Oil obtained from the grain of the corn plant of Claim 49.

92. Oil obtained from the grain of the corn plant of Claim 51.

93. Oil obtained from the grain of the corn plant of Claim 53.

94. Oil obtained from the grain of the corn plant of Claim 55.

95. Oil obtained from the grain of the corn plant of Claim 57.

96. Oil obtained from the grain of the corn plant of Claim 59.

97. Animal feed derived from the processing of corn grain of Claim 61.
98. Animal feed derived from the processing of corn grain of Claim 62.
99. Animal feed derived from the processing of corn grain of Claim 63.
100. Animal feed derived from the processing of corn grain of Claim 64.
101. Animal feed derived from the processing of corn grain of Claim 65.
102. Animal feed derived from the processing of corn grain of Claim 66.
103. Animal feed derived from the processing of corn grain of Claim 67.
104. Animal feed derived from the processing of corn grain of Claim 68.
105. Animal feed derived from the processing of corn grain of Claim 69.
106. Animal feed derived from the processing of corn grain of Claim 70.
107. Animal feed derived from the processing of corn grain of Claim 71.
108. Animal feed derived from the processing of corn grain of Claim 72.
109. Animal feed derived from the processing of corn grain of Claim 73.
110. Animal feed derived from the processing of corn grain of Claim 74.
111. Animal feed derived from the processing of corn grain of Claim 75.
112. Animal feed derived from the processing of corn grain of Claim 76.
113. Animal feed derived from the processing of corn grain of Claim 77.
114. Animal feed derived from the processing of corn grain of Claim 78.
115. The use of the oil of Claim 79 in food, animal feed, cooking or industrial applications.
116. The use of the oil of Claim 80 in food, animal feed, cooking or industrial applications.
117. The use of the oil of Claim 81 in food, animal feed, cooking or industrial applications.
118. The use of the oil of Claim 82 in food, animal feed, cooking or industrial applications.
119. The use of the oil of Claim 83 in food, animal feed, cooking or industrial applications.
120. The use of the oil of Claim 84 in food, animal feed, cooking or industrial applications.
121. The use of the oil of Claim 85 in food, animal feed, cooking or industrial applications.
122. The use of the oil of Claim 86 in food, animal feed, cooking or industrial applications.
123. The use of the oil of Claim 87 in food, animal feed, cooking or industrial applications.
124. The use of the oil of Claim 88 in food, animal feed, cooking or industrial applications.

125. The use of the oil of Claim 89 in food, animal feed, cooking or industrial applications.

126. The use of the oil of Claim 90 in food, animal feed, cooking or industrial applications.

127. The use of the oil of Claim 91 in food, animal feed, cooking or industrial applications.

128. The use of the oil of Claim 92 in food, animal feed, cooking or industrial applications.

129. The use of the oil of Claim 93 in food, animal feed, cooking or industrial applications.

130. The use of the oil of Claim 94 in food, animal feed, cooking or industrial applications.

131. The use of the oil of Claim 95 in food, animal feed, cooking or industrial applications.

132. The use of the oil of Claim 96 in food, animal feed, cooking or industrial applications.

133. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 23 or 25.

134. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 27.

135. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 29.

136. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 31.

137. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 33.

138. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 35.

139. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 37.

140. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 39.

141. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 41.

142. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 43.

143. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 45.

144. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 47.

145. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 49.

146. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 51.

147. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 53.

148. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 55.

149. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 57.

150. Products made from the hydrogenation, fractionation, interesterification, or hydrolysis of oil obtained from the grain of the plant of Claim 59.

151. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 97.

152. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 98.

153. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 99.

154. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 100.

155. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 101.

156. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 102.

157. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 103.

158. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 104.

159. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 105.

160. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 106.

161. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 107.

162. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 108.

163. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 109.

164. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 110.

5 165. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 111.

166. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 112.

167. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 113.

10 168. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 114.

169. A corn grain comprising in its genome the chimeric gene of Claim 22 wherein said corn grain has an oil content in the range from about 6% to about 10% on a dry matter basis and further wherein said oil is comprised of not less than about 60% oleic acid of the total oil content of the seed.

170. Animal feed derived from the processing of the corn grain of Claim 169.

171. A method of improving the carcass quality of an animal by feeding the animal a carcass quality improving amount of the animal feed of Claim 170.

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